

[Document's Name] Scope of the Claim for Patent

[Claim 1]

A high pressure discharge lamp lighting device of supplying an AC lamp current to light up a high pressure discharge lamp, characterized by providing

a lamp current forming device of forming the lamp current to a current waveform comprising a standard period current supplied at a predetermined standard period and a short period current of a period shorter than that described above in which, on every one-half period of the standard period current, a short period current that inverts the polarity from an identical polarity to an opposite polarity of the next one-half period is supplied for 1-period, and optionally setting a duty ratio before and after the polarity inversion of the short period current.

[Claim 2]

A high pressure discharge lamp lighting device of supplying an AC lamp current to light up a high pressure discharge lamp, characterized by providing

a lamp current forming device of forming a lamp current to a waveform where a standard period current supplied at a predetermined standard period and a short period current of a period shorter than that described above

are alternately replaced with each other on every 1 period,
and

optionally setting a duty ratio before and after the
polarity inversion for the standard frequency current and/or
the short frequency current.

[Claim 3]

A high pressure discharge lamp lighting device
according to claim 1 or 2, wherein the lamp current forming
device has a waveform setter of gradually increasing or
gradually decreasing the current value before and/or after
the polarity inversion of the short period current into a
ramp wave.

[Claim 4]

A high pressure discharge lamp lighting device
according to claim 1 or 2, wherein the lamp current forming
device has a current controller of setting the current value
before and/or after the inversion of the polarity of the
short period current to higher than the current value of the
standard signal current.

[Claim 5]

A high pressure discharge lamp lighting device
according to claim 4, wherein the current value of the short

period current is set by the current controller to 1.2 times or more and 5 times or less the current value of the standard period current.

[Claim 6]

A high pressure discharge lamp lighting device according to claim 1, wherein the lamp current forming device has a period setter of setting the standard period for the standard period current to $1/500$ sec or more and $1/60$ sec or less and the period for the short period current to $1/30$ times or more and $1/4$ times or less the standard period.

[Claim 7]

A method of lighting up a high pressure discharge lamp of supplying an AC lamp current to light up a high pressure discharge lamp, characterized by using a standard period current supplied at a predetermined standard period and a short period current of a period shorter than that described above as the lamp current and supplying, on every one-half period of the standard period current, a short period current that inverts the polarity from an identical polarity to an opposite polarity with that in the next one-half period for one period while optionally setting a duty ratio before and after the polarity inversion and supplying for one period.

[Claim 8]

A method of lighting up a high pressure discharge lamp of supplying an AC lamp current to light up a high pressure discharge lamp, characterized by

forming the lamp current with a current waveform where a standard period current at a predetermined standard period and a short period current of a period shorter than that described above are alternately replaced with each other on every 1 period, and supplying while controlling a duty ratio before and after the polarity inversion of the standard period current and/or the short period current to a duty ratio being set in accordance with the high pressure lighting light.